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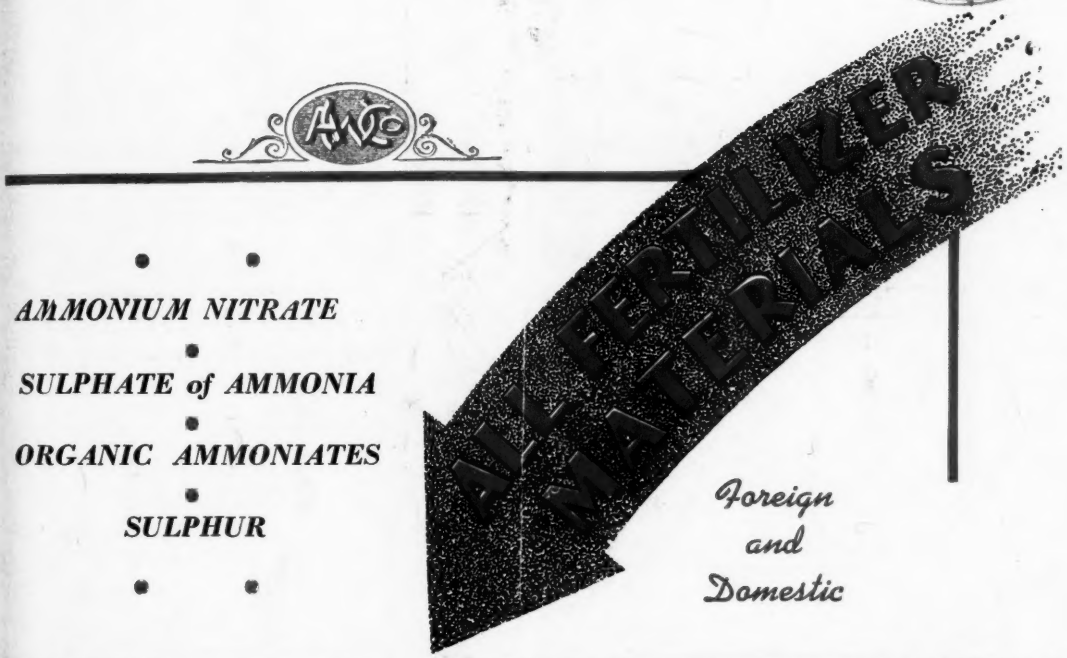

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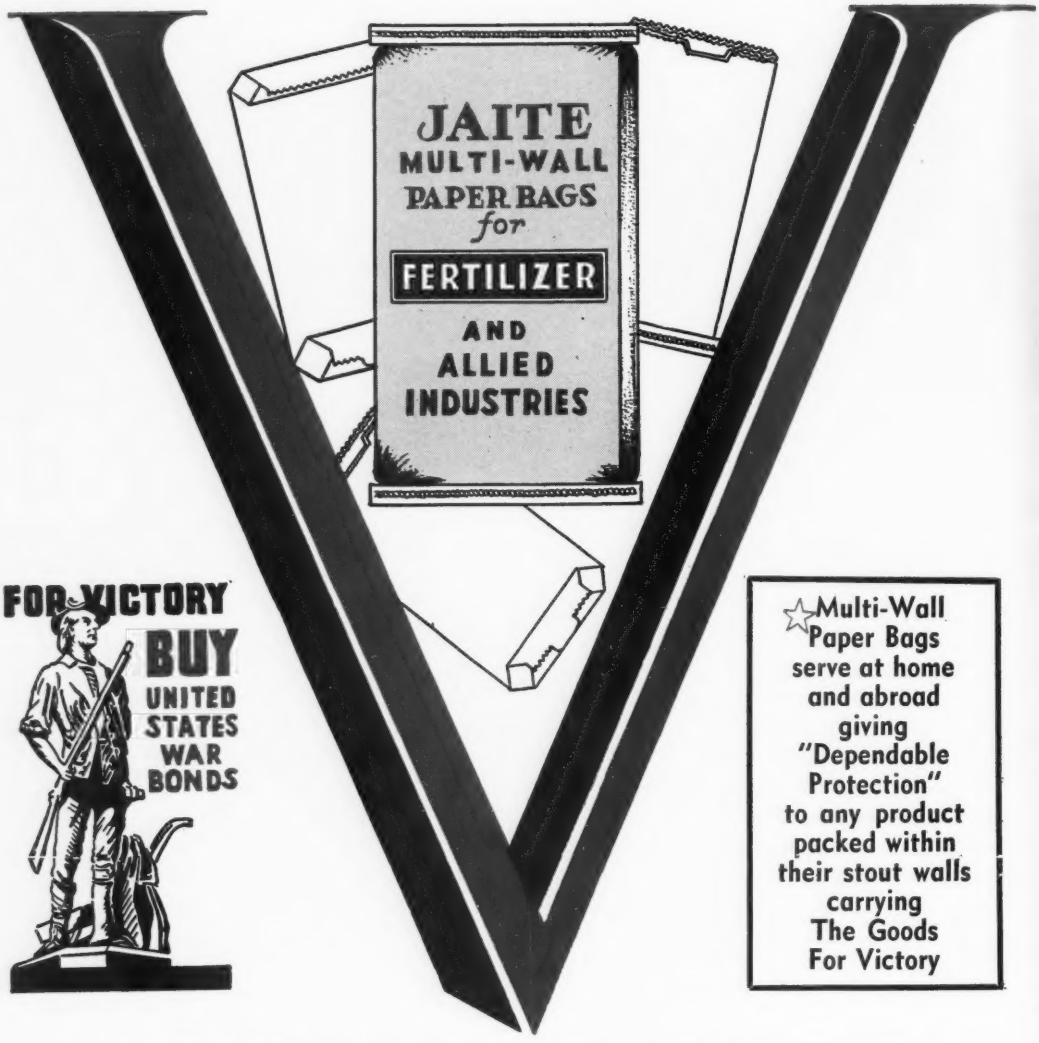

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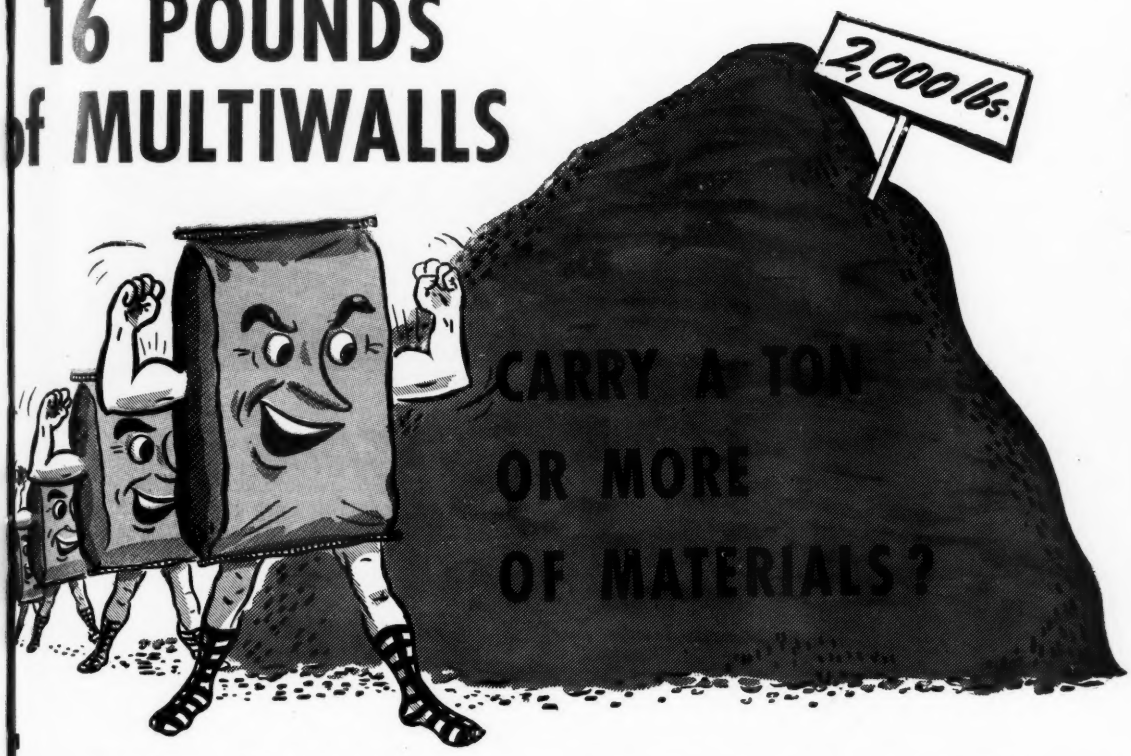

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Vol. 103 SEPTEMBER 8, 1945 No. 5

POTASH IN 1944

By BERTRAND L. JOHNSON AND DOROTHY I. MARSH

U. S. Bureau of Mines, Washington, D. C.

New records have been made in the annual production and sales of domestic potassium salts. In 1944, 1,578,498 short tons of marketable potassium salts containing 834,568 tons of equivalent potash (K_2O) were produced. A somewhat smaller quantity (1,543,420 tons), likewise a record, was sold; according to the producers, this material contained 817,892 tons of equivalent potash. Stocks of potassium salts, in terms of K_2O in producers' hands at the end of 1944, were more than double those of 1943 and larger than in any recent year. Exports of both fertilizer and chemical potash were less in 1944 than in 1943. Imports of potash for fertilizer purposes were mush less than in 1943, but those for chemical use were larger. Domestic consumption of potash made a new record—about 753,000 short tons of K_2O.

A general summary, by Turrentine, (*1*)* of the American potash industry under wartime conditions, appeared late in 1944.

Potash Allocation Order M–291, which was to have expired May 31, 1944, was amended April 3,1944, and extended for another twelve months. Effective March 22, 1945, all primary potash salts (muriate of potash, sulphate of potash, sulphate of potash-magnesia, and run-of-mine potash) were removed from Allocation Order M–291 and placed under General Chemicals Order M–300.

Postwar Outlook

The present domestic potash mines can produce more than normal domestic requirements under peace time conditions. Availability of foreign supplies after the war will limit foreign markets for American potash, and certain of these potash-producing nations may enter the domestic market in competition with American companies, especially if it is considered advisable to restrict domestic production to conserve our known potash resources. The enlarged food-production programs probably will maintain domestic potash output at high levels for some time.

Domestic Reserves

The domestic potash industry is based largely upon the sylvite (KCl) deposits of the Carlsbad (N. Mex.) region; the potassium-bearing brines of Searles Lake, Calif., and Salduro Marsh, Utah; and the langbeinite ($K_2SO_4.2MgSO_4$) deposits of the Carlsbad region. Estimates made about 1940 placed the total known resources of water-soluble potash in the above deposits at around 90 million tons K_2O, adequate for only about 100 years at the present rate of consumption. Even on the basis of these early estimates the Committee on National Fertilizers and Lime Policy urges (*2*) that greatly intensified efforts be made by the Federal Government to discover new domestic sources of water-soluble potash on public land; that, until vastly larger deposits are discovered, our limited known resources be looked upon as a strategic reserve; and that, if extensive new deposits are not located soon, further vigorous steps be taken to curtail the use of American deposits and replace them with imports.

Most of the known domestic potash reserves are in the Texas-New Mexico field. According to estimates made in 1940 these beds contain 75,000,000 tons K_2O. Such estimates were based on beds of potash salts 4 feet or more in thickness which analyze at

*See "Literature Cited" at end of article.

least 14 per cent K_2O. Mansfield and Lang, (*3*), after calling attention to the fairly wide distribution of sylvite in this field, state that:

"The richer sylvite beds are localized in four minior areas which have been prospected in some detail and which are surrounded by barren or relatively barren ground. Such prospecting as has been done outside of these areas has not thus far led to any very encouraging results, but it is quite possible that other rich localities may be discovered . . ."

Three of these known areas are now being mined, and the fourth was prospected by the Government in 1944. The reserves in the

SALIENT STATISTICS OF THE POTASH INDUSTRY IN THE UNITED STATES, 1942–44

	1942	1943	1944
Production:			
Potassium salts (marketable) ..... short tons	1,267,455	1,428,840	1,578,498
Approximate equivalent, K_2O ..... do	679,206	739,141	834,568
Sales by producers:			
Potassium salts ..... do	1,277,317	1,401,271	1,543,420
Approximate equivalent, K_2O ..... do	680,831	732,151	817,892
Value at plant	$22,962,518	$26,183,073	$29,487,413
Average per ton	$17.98	$18.69	$19.11
Imports:			
Fertilizer materials ..... short tons	15,895	45,009	13,739
Approximate equivalent, K_2O ..... do	2,915	17,005	3,760
Value	$418,787	$1,287,022	$397,575
Chemical materials ..... short tons	5,433	419	5,402
Approximate equivalent, K_2O ..... do	1,444	104	1,108
Value	$1,784,671	$156,097	$1,650,776
Exports:			
Fertilizer materials ..... short tons	84,402	111,541	110,057
Approximate equivalent, K_2O[1] ..... do	42,600	60,142	61,312
Value	$2,184,044	$3,168,446	$3,139,851
Chemical materials ..... short tons	13,307	20,133	15,419
Approximate equivalent, K_2O[1] ..... do	6,520	9,865	7,555
Value	$3,611,656	$3,950,542	$3,008,565
Consumption:			
Apparent consumption:[2]			
Potassium salts ..... short tons	1,200,936	1,315,025	1,437,085
Approximate equivalent, K_2O ..... do	636,070	679,253	753,893
Actual sales consumption:			
Approximate equivalent, K_2O ..... do	635,408	[3] 678,131	752,332

[1] Estimate by Bureau of Mines.
[2] Quantity sold by producers, plus imports, minus exports.
[3] Revised figure.

POTASSIUM SALTS PRODUCED IN THE UNITED STATES 1942–44, BY GRADES, IN SHORT TONS

Grade	1942	1943	1944
Muriate of potash:			
60–62 per cent K_2O minimum [1]	878,997	934,961	1,082,132
48–50 per cent K_2O minimum	85,680	99,137	114,550
Manure salts, run-of-mine	183,404	242,189	217,560
Sulphate of potash and sulphate of potash-magnesia	119,374	152,553	164,256
	1,267,455	1,428,840	1,578,498

[1] Includes refined potash.

POTASSIUM SALTS PRODUCED, SOLD, AND IN PRODUCERS' STOCKS IN THE UNITED STATES, 1940–44

	Production			Sales				Producers' stocks		
Year	Operators	Potassium salts (short tons)	Equivalent as potash (K_2O) (short tons)	Operators	Potassium salts (short tons)	Equivalent as potash (K_2O) (short tons)	Value f. o. b. plant	Operators	Potassium salts (short tons)	Equivalent as potash (K_2O) (short tons)
1940..	7	658,249	379,679	7	677,892	393,058	$12,562,050	7	35,060	16,370
1941..	7	986,458	524,875	7	994,843	531,346	17,368,237	7	26,374	9,712
1942..	7	1,267,455	679,206	7	1,277,317	680,831	22,962,518	7	14,158	6,041
1943..	7	1,428,840	739,141	7	1,401,271	732,151	29,183,073	7	43,591	13,984
1944..	6	1,578,498	834,568	6	1,543,420	817,892	29,487,413	6	76,123	29,763

areas now producing are being rapidly exhausted. A recent article (*4*) states that:

"Apparently the four major companies (three of which are in the New Mexico field) can continue for perhaps 10 to 15 years at present rates without exhausting the reserves to which they have acquired rights."

The rights referred to were acquired before the new regulations promulgated by the United States Department of the Interior in January 1945. The Government drilling in the fourth area in the Carlsbad region proved up only a few million tons of K_2O. The known economically recoverable potash reserves in this field therefore appear quite limited.

With reference to national security, even in the near future, further search for deposits of soluble potash is urgently needed. Probable areas where such desposits might be found include the Texas-New Mexico field, the Grand County (Utah) field, and eastern United States. Possibilities are definitely known in the first two fields. The salt deposits of eastern United States have never been tested for potash beds by core drilling, although well brines show significant quantities of potash, and salt beds containing 8 per cent KCl have been found in Nova Scotia, northeast of this area.

Production and Sales

The annual increase in production of marketable potassium salts in the United States since 1934 was once more evident in 1944. Again it was large, 149,658 tons more being produced in 1944 than in 1943, and the approximate equivalent K_2O content of the production was 95,427 tons greater. Sales exceeded a million and a half (1,543,420) tons in 1944 and were a little more than 10 per cent over those in 1943. The contained equivalent potash (K_2O) was 817,892 tons, an increase of nearly 12 per cent over 1943. Production exceeded sales; producers' stocks were again larger at the end of the year than at the beginning and larger than in several recent years. The average value of the potassium salts sold in 1944 was $19.11 per ton.

The potash industry retains its western character. Virtually all the 1944 output came from California, New Mexico, and Utah, largely from the deeply buried Permian saline sedimentary deposits of New Mexico. Only a small quantity (a byproduct of cement operations in Maryland) came from the Eastern States. The domestic potash salts sold in 1944 were largely refined or processed products.

The potash-producing companies in the United States in 1944, by States, were as follows:

California:

The American Potash & Chemical Corp., 122 East Forty-second Street, New York City (plant at Trona, on Searles Lake, Calif.).

Maryland:

North American Cement Corp., 41 East Forty-second Street, New York City (plant at Security, Md.).

New Mexico:

International Minerals & Chemical Corp., 20 North Wacker Drive, Chicago, Ill. (mine and plant near Carlsbad, N. Mex.).

Potash Company of America, Carlsbad, N. Mex. (mine and plant near Carlsbad, N. Mex.).

United States Potash Co., Inc., 30 Rockefeller Plaza, New York City (mine and plant near Carlsbad, N. Mex.).

Utah:

Bonneville, Ltd., 540 West Seventh South, Salt Lake City, Utah (plant near Wendover, Utah).

SALES OF POTASH IN THE UNITED STATES FOR CONSUMPTION AND EXPORT, 1942–44, IN SHORT TONS OF K_2O

	1942	1943	1944
Deliveries of primary potash of domestic origin by major companies, as from reports of American Potash Institute—			
In United States and possessions:			
Agricultural	558,356	[1] 590,733	675,787
Chemical	63,388	[1] 84,367	82,198
For export	38,504	[1] 55,261	57,850
	660,248	[1] 730,361	815,835
Imports for consumption plus sales of minor domestic producers	24,280	[1] 17,777	5,364
	684,528	[1] 748,138	821,199
Total exports (estimate by Bureau of Mines)	49,120	70,007	68,867
Actual sales for consumption in the United States	635,408	[1] 678,131	752,332

[1] Revised figures.

Consumption

Consumption of potash salts in the United States and its possessions in 1944 was approximately 753,000 tons of K_2O. The following table, based largely upon deliveries of potash of domestic origin as reported by the American Potash Institute, indicates actual sales of 752,332 tons for domestic consumption in the United States. Apparant consumption, calculated by subtracting exports from the sum of the imports and producers' sales, was 753,893 tons of K_2O in 1944.

According to figures of the American Potash Institute on potash deliveries, 89 per cent of the domestic deliveries of American potash in 1944 went to the fertilizer industry and 11 per cent for chemicals.

Prices

Price lists for the 1944–45 fertilizer season were released by the major potash companies on dates ranging from April 1 to May 15, 1944. Most of the schedules covered the period from June 1, 1944, to May 31, 1945. The following base prices were reported by the various producing companies:

Muriate of potash (62 to 63 per cent; 62 per cent K_2O minimum).	53½ cents per unit K_2O.
Muriate of potash (60 per cent K_2O minimum).	53½ cents per unit K_2O.
Muriate of potash, granular (50 per cent K_2O minimum).	53½ cents per unit K_2O and in the first issued schedule 56 cents per unit K_2O (later reduced to 53½ cents).
Muriate of potash, granular (48 to 52 per cent, 48 per cent K_2O minimum).	53½ cents per unit K_2O.
Manure salts:	
22 to 26 per cent K_2O, 22 per cent K^2O minimum, run-of-mine.	20 cents per unit K_2O.
22 per cent K_2O minimum.	20 cents per unit K_2O.
Sulphate of potash (90 to 95 per cent K_2SO_4, basis 90 per cent K_2SO_4).	$36.25 per short ton.
Sulphate of potash-magnesia (basis 40 per cent K_2SO_4, 18.50 per cent per cent MgO).	$26.00 per short ton.

Maximum Price Regulation 404—Potash, effective June 18, 1943, providing for maximum prices of potash, was in effect until July 5, 1944, when it was superseded by Revised Maximum Price Regulation 205 (Fertilizer Raw Materials) of June 30, 1944. Muriate of potash, manure salts, sulphate of potash, and sulphate of potash-magnesia were covered in the new regulations, as in the old. No changes were made in the base prices.

Retail prices of potash were covered during 1944 by Second Revised Maximum Price Regulation 135 of November 17, 1943; Second Revised Maximum Price Regulation 135, including Amendment 1, of January 5, 1944; and Second Revised Maximum Price Regulation 135 as amended July 26, 1944.

Review by States

General.—In 1944 merchantable potash salts were produced in four States—California, Maryland, New Mexico, and Utah. The output of the States (except New Mexico, where there were three companies) cannot be given separately without disclosing individual company returns. New Mexico was by far the largest domestic producer, furnishing 85 per cent of the total. California, although a much smaller producer than New Mexico, furnished considerably more than the combined output of the other two States.

A program for converting potassium chloride to potassium sulphate was initiated by the Government in November 1944 to supplement the upply of potassium sulphate, particularly in tobacco-producing areas. Potassium chloride was to be substituted for sodium choride in the production of hydrochloric acid at the Rubber Reserve Company plant at Louisville, Ky. The plan was abandoned, however, shortly after the start of operations, because of a break-down of the acid-producing facilities.

Discovery of metals of the platinum group in western alunites has been reported (*5*). Traces of platinum metals are said to have been identified in alunite samples from Sugar Loaf Peak, Yuma County, Ariz., and Marble Mountain, Rio Grande County, Colo. Traces of rubidium are also reported in a few samples and traces of gallium in nearly all samples examined.

California.—The American Potash & Chemical Corp. (122 East Forty-second Street, New York City), only producer of potash in California, is reported to have enlarged its plant at Searles Lake and to have improved

(Continued on page 20)

July Sulphate of Ammonia

There was practically no change in the by-product sulphate of ammonia output during July, according to the U. S. Bureau of Mines report. Production increased 5.3 per cent over June, as was to be expected from the longer calendar month but was still slightly under the figures for July, 1944. Sales were still lower than production and as a result the stocks on hand at producing points increased from 24,612 tons on June 30th to 27,043 tons on July 31st.

	Sulphate of Ammonia	Ammonia Liquor
Production	Tons	Tons NH_3
July, 1945	67,327	2,327
June, 1945	63,962	2,281
July, 1944	69,281	2,601
January-July, 1945	464,893	16,559
January-July, 1944	477,072	18,565
Sales		
July, 1945	64,870	2,033
June, 1945	61,839	2,122
July, 1944	62,965	2,503
January-July, 1945	507,235	15,532
January-July, 1944	429,212	17,848
Stocks on hand		
July 31, 1945	27,043	872
June 30, 1945	24,612	672
July 31, 1944	75,378	650

Allocations Removed from Some Fertilizer Materials

To carry out their promise that wartime restrictions on business would be removed as quickly as possible, the Government has removed the allocation of many materials used in domestic manufacture. A number of schedules under General Allocation Order M-300 have been revoked. Among these are Schedules 79 and 80, governing distribution of synthetic ammonia and nitrogen compounds, which are removed from allocation as of September 30, 1945. Also revoked as of August 31, 1945, is Schedule 74, governing sulphuric acid distribution.

Because of the cut-back in munitions needs and the consequent abundant supply of ammonia now available for fertilizer, it is proposed to close down, at least temporarily, six of the Government ammonia plants. Two, the Jayhawk and Ozark plants, are expected to continue to produce fertilizer grade ammonia nitrate solutions which will be shipped to other ordnance plants for graining. The TVA plant will continue in operation and Canadian imports of ammonium nitrate are expected to continue.

Other revocations affecting the fertilizer industry are General Order ODT 7, covering movement in railway tank cars, effective August 19, 1945; General Orders ODT 3 and 17, covering shipments by motor truck by common and private carriers, effective November 1, 1945.

California Association Holds Fertilizer Conference

An interesting meeting of the California Fertilizer Association was held in Los Angeles on August 10th when members of the Association met at dinner with about 60 representatives of the two southern campuses of the University of California. The President of the Association, Ned Lewis, introduced the topic for discussion, "How Best Can the Interests Here Represented Cooperate for Best Service to California Agriculture?" He outlined the present set-up of fertilizer distribution in California and emphasized the need for help from the College of Agriculture in determining the changing soil needs for plant food in various sections of the State.

Dr. Robert W. Hodgson, Assistant Dean of the College, stressed the size of the problem due to the great variety of soils and crops and recommended that the Association hold fertilizer conferences at the various college campuses throughout the State.

Dr. L. D. Batchelor, Director of the Citrus Experiment Station at Riverside, Cal., presented certain specific problems of the citrus industry. He described a number of orchards on various types of soil which were losing their productiveness after a number of years but prior to the normal life expectancy of those types of fruit trees. Replanting did not seem to solve the problem as crops from the new trees were no better than the short crops from the trees they replaced. He gave as his opinion that perhaps 25 per cent of the citrus orchards were "problem" orchards. The answer seemed to lie in more extensive research than has been possible up to now.

In the round table discussion which followed, the more scientific use of fertilizers was suggested as having given notable results in the case of certain vegetables and other crops. The meeting agreed on the importance of the legislature appropriating more adequate amounts for use in soil tests and fertilizer experiments throughout the State.

THE AMERICAN FERTILIZER
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Early Movement of Fertilizers Imperative

Relaxation of farmers in ordering fertilizers for early delivery is to be feared, now that the wars are over. Needless to say, transportation difficulties are still with us and are likely to remain for some time to come. Railroads are taxed to the utmost and war-made traffic will not end till all soldiers are back home. So, it is high time for fertilizer manufacturers to launch their fall campaigns for early ordering of spring fertilizers.

National and State agricultural agencies are aware of the transportation shortage and are willing to launch a campaign for early ordering of fertilizers. In fact, some action has already been taken by these agricultural agencies. A word of encouragement, with perhaps an explanation of the difficulties faced by the manufacturer, may be just what is needed to get full and energetic support of the agricultural agencies, especially county agents, in arousing farmers to prompt action.

Though gasoline rationing has ended to brighten the prospects for truck haulage, too much dependence upon that means of transportation may result in disappointment. There is a shortage of trucks and tires, a shortage not to be quickly nor easily overcome.

Another year of comparatively heavy applications of fertilizers to crops, is anticipated. Farmers are able to buy and many of them realize that the best way to increase yields and profits is by an investment in plant food. If this view is accepted there will be no let-up in transportation requirements for handling fertilizers against the needs of 1946.

Perhaps the transportation problem uppermost in the fertilizer manufacturers' minds concerns deliveries of materials to his plant so that he can get into full-time production and begin filling the early orders of farmers. This, however, should not prevent the launching of the campaign for early movement of fertilizers to the farms. It will mean a good deal if there are farmers' orders in hand against which to ship as soon as materials arrive and can be processed at the plant. Keeping an outgo of fertilizers equal to the income of materials, of course, means maximum efficiency and lowest possible production cost.

After numerous trials of various test plants, Cornell University scientists have determined that the sunflower plant is a sensitive indicator of the available potassium level of soils.

Potash Removed from Allocation

The Government has announced that Schedule 98 of General Allocation Order M-300, governing the distribution of potash, has been revoked effective September 30, 1945. This action has been expected for some time and will not make any material changes in present conditions. Supplies of potash for agriculture have been adequate during the past years and almost every manufacturer has already contracted for next season's tonnage.

Barrett Adds to Technical Staff

The Barrett Division of Allied Chemical & Dye Corporation has announced two additions to their technical staff. James F. Barns, formerly with the Carnegie-Illinois Steel Corporation, has been assigned to the Barrett office in Cleveland, Ohio. Frank V. Feorello, formerly with the Wright Aeronautical Corporation, will be located at the main offices of the company in New York.

Fertilizers in New Fields

Commercial fertilizers are going to work these days on farms where they never have been used before. The striking changes reported by the Department of Agriculture show that the great percentage increases are in important farm areas that never have used much commercial fertilizer. The big increases in actual tonnage are still in the eastern and southern areas where fertilizer has long been accepted as a necessity in crop production. A report on estimates of fertilizer use in 1944 compares the figures for groups of States with those for the pre-war years, 1935–39. "Usage was 367 per cent of pre-war in the West North Central, 243 per cent in the Western, 236 per cent in the East North Central, 204 per cent in the South Central, 156 per cent in the Middle Atlantic, 151 per cent in New England, and 150 per cent in the South Atlantic."

Iowa used about eight times as much as in pre-war years. Other States with a "very rapid increase in plant nutrient consumption" in recent years are: Wisconsin, Illinois, Minnesota, Arkansas, Texas, Idaho and Arizona. "The rate of consumption per acre of cultivated land, however, is still very small in these States. Comparing estimates for 1944 with those for 1943 further emphasizes the trend toward use of fertilizers in areas where they have not been considered necessary or profitable in the past. The country as a whole used 7.4 per cent more plant food in 1944 than in 1943. But the following groups of States used more by the following percentages: Western, 30.6; West North Central, 29.4; the Territories, 22.4; East North Central, 16.9; Middle Atlantic, 7.7; South Central, 3.6; and South Atlantic, 1 per cent.

Cooperative Council to Pass on Federal Fertilizer Bills

A meeting of the Executive Committee of the National Council of Farmer Cooperatives is being held in Washington on September 7th and 8th. One of the principal items on the program is the report of a subcommittee on the Hill-Bankhead and Flannagan bills in Congress which would put the Government in the fertilizer manufacturing business. The subcommittee has held several meetings during the summer and is of the opinion that the present privately owned and operated fertilizer industry is capable of supplying all fertilizer needs of the country provided adequate supplies of materials and labor are available.

If the Executive Committee accepts the report, it is then submitted to the various branch organizations of the Council. Upon receiving their unanimous approval, it then becomes the adopted policy of the Council. The action to be taken at Washington is expected to have a very important influence upon the progress of the bills in Congress.

Fertilizers for Maine Hay Fields

The Maine Extension Service, in a circular entitled, "Haying in Wartime," makes the following comments on how to fertilize hay fields. Fertilize part or all of the hay fields between September 15th and October 15th for next year's crop. You can make more hay on the same acreage with less labor, you can begin haying earlier, and the quality of the hay will be better. On the matter of how much fertilizer one should use in the fall, the following suggestions are made: On clover—use from 500 to 800 lbs. per acre of a 5–10–10 fertilizer or its equivalent. On grass—use 600 to 1,000 lbs. of a 7–7–7 fertilizer or 10 tons of manure or for one year only—300 to 500 lbs. of nitrate of soda or its equivalent.

Idaho Plant Promises Ample Superphosphate

The first supply of phosphate fertilizer in four years is in prospect for Oregon farmers if they will take advantage of an opportunity to order their supplies immediately and take delivery when the material arrives, reports Art King, Extension soils specialist at Oregon State College.

A superphosphate manufacturing plant has recently been completed in eastern Idaho which has agreed to ship an almost unlimited supply to Oregon for delivery between now and January 1st. After that date the production from this plant is otherwise contracted, King explains.

The quality of the Idaho superphosphate is fully equal to that produced in pre-war days. Under good storage conditions it should keep through the winter months without difficulty, King believes. It is thoroughly cured and will not "set up" to a point where it cannot be spread unless subject to outside moisture.

Farm Prosperity Should Continue

Prices of most farm products will be maintained close to current levels well into 1946, it is forecast by the U. S. Bureau of Agricultural Economics. Civilian demand is expected to continue strong for many months, despite prospects for a reduction in consumer incomes resulting from closing down of war plants.

Prices received by farmers, according to U. S. Department of Agriculture figures, at the war's end in mid-August averaged 204 per cent of the 1910–14 average, compared with 206 in July, 193 in August, 1944, and a 1935–39 average of 107. Prices received were 118 per cent of parity in August. The general level of prices received by farmers for all farm products advanced more rapidly in the 44 months since Pearl Harbor than did prices paid. Prices received rose 43 per cent, compared with an upturn of only 22 per cent in the index of prices paid by farmers.

Dr. W. G. Colby of the Massachusetts Experiment Station draws these conclusions from what he calls his "back yard experiment" in growing hybrid corn. Corn needs heavy fertilization. He applied the equivalent of 1,100 lbs. per acre of a 10–12–10 mixture or 110 lbs. of nitrogen, 135 lbs. of phosphorus, and 110 lbs. of potash. Of the 26 varieties on which yields were taken, 18 yielded at a rate of 100 bushels or more of shelled grain per acre and five of these produced over 120 bushels.

Obituary

Troy G. Chastain

Troy G. Chastain, President of the Atlanta Chemical Company, died at Atlanta on August 25th following a heart attack. He was 60 years of age.

Mr. Chastain organized the company in 1920 and later opened up a branch fertilizer plant in Savannah to serve that section of the State. A graduate of the College of Agriculture at the University of Georgia, he took an active interest in the civic affairs of Atlanta. During his career he served on the Board of Commissioners of Fulton County from 1937 to 1942 and was a former member of the Parks Committee. At the time of his death he was Executive Director of the Boy Scout movement in Atlanta.

Mr. Chastain is survived by his wife, Mrs. Lillian Burns Chastain, also by three sisters and three brothers.

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FERTILIZER MATERIALS MARKET

NEW YORK

Drop in Steel Production Causes Marked Shortage in Sulphate of Ammonia Output. Better Supply of Ammonium Nitrate and Nitrogen Solutions Expected. Organics Still Scarce. Superphosphate and Potash Supplies Adequate.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, September 5, 1945.

Sulphate of Ammonia

A very tight situation is developing in the sulphate of ammonia market. With the distinct drop in steel production, production of sulphate is now only about 70 per cent of capacity. As a consequence, the reserve supplies have been exhausted and contract shipments are being made from production. Some shipments are from two weeks to a month behind schedule.

Nitrate of Soda

Inquiries are still being received from some northern areas but adequate stocks are on hand to take care of all purchases. Material from Chile continues to arrive in good quantity. The August prices have been continued during September.

Ammonium Nitrate and Nitrogen Solutions

About 7,000 tons of domestic ammonium nitrate will be available for agriculture during the coming months in addition to imports from Canada. Anhydrous ammonia is being released more freely from ordnance plants for use in fertilizer production. With the better supply of tank cars now available, both this latter material as well as nitrogen solutions will be moving in volume to the industry.

Organics

There has been no change in the organics situation. Supply is still low and feed mixers are taking everything available at ceiling prices. The only hope in sight is the prospect of greatly increased meat production which has been predicted for the coming fall months.

Phosphate Rock

The situation in phosphate rock continues satisfactory. All requirements of acidulators are being taken care of and export shipments to northern Europe and the Pacific are continuing strong. Some improvement in the labor shortage is hoped for in the near future.

Superphosphate

Production continues at established levels and deliveries on contracts are being made steadily. Inquiries have developed for additional material but unless production increases, it is problematical whether producers can handle this additional business. Manpower shortage is still the big handicap and it is hoped that this will soon improve.

Potash

Production is being maintained at high levels with practically all fertilizer mixers being covered for their estimated requirements. Producers are still hampered by unsatisfactory labor conditions.

CHARLESTON

Fertilizer Sales Show Increase. Organic Materials Still Scarce. Shortage in Sulphate of Ammonia

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, September 6, 1945.

Increase in fertilizer tag sales continues. Sales for the first seven months were 9 per cent larger than in the same period last year.

Organics.—There has been no improvement in the situation as regards supplies of these and the insistent demand continues.

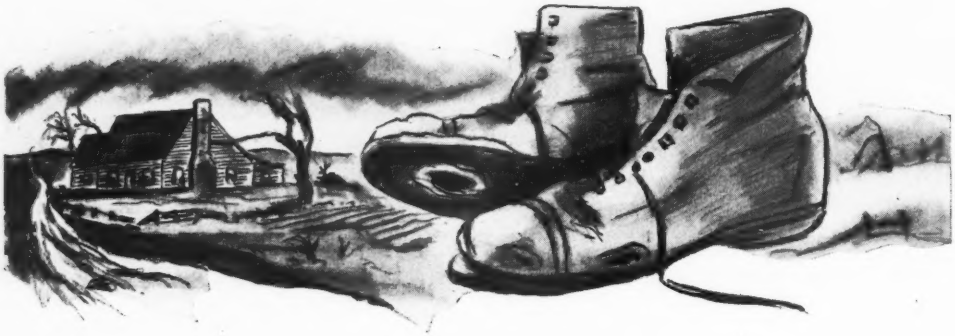
Nitrogen Solutions.—There is every indication now that supplies of these will be probably more plentiful during the coming season.

Sulphate of Ammonia.—This market continues extremely tight, especially in the southeast and manufacturers are ordering the material just as quickly as produced. There does not seem to be any reserve stock.

Castor Pomace.—More castor beans have recently been brought in but the production of castor pomace still remains insufficient.

Animal Ammoniates.—Both blood and tankage continue extremely short due to reduced packing house production.

Farms too...



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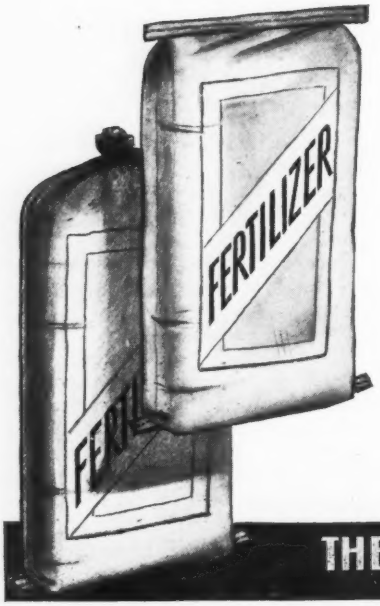

Commercial fertilizer is saving thousands of these farms—millions of acres of land from becoming unproductive. The economical practice of applying a few sacks of fertilizer per acre has an amazing effect on farm yields. The War Food Administration estimates that 25% of food production in 1945 will be yield increases from fertilizer. Thus, fertilizer is playing an important role in winning the war and promoting better farming conditions for the peace to come.

We are proud of the fact that many of the large fertilizer producers pack and ship their products in RAYMOND MULTI-WALL PAPER SHIPPING SACKS.

THE RAYMOND BAG COMPANY
MIDDLETOWN, OHIO.

CHICAGO

No Improvement in Fertilizer Organics Market. Demand for Feed Materials Still Heavy and Production Light.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, September 4, 1945.

The organics remain as before; no fertilizer material appears on the market. Order M-368 affecting production of nitrogenous is still unchanged.

No encouragement is submitted by packers for an increase in animal proteins. Demand remains heavy and production light.

Ceiling prices are:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit N); blood, $5.53 ($6.72 per unit N); dry rendered tankage, $1.25 per unit of protein, f. o. b. producing points.

Nitrogen Tests on Wisconsin Pastures

A series of demonstrations conducted by C. J. Chapman, of the Soils Department, College of Agriculture, Madison, Wis., in cooperation with four County Agents, has established the value of ammonium nitrate and other nitrogenous fertilizers as top dressing for pastures and hay fields. In a recent bulletin, the results of experiments on hay with ammonium nitrate on 28 different farms during 1945 are recorded. Most of the treatments were at the rate of 200 lb. per acre, with a few at 150 lb. and one at 400 lb. The profits on the yield per acre, over and above the cost of the fertilizer ranged from $5.57 on one Bayfield County farm to $33.00 from one Iron County farmer. The average profit for all the demonstrations was $16.82 per acre.

According to Mr. Chapman, ammonium nitrate, when applied as a top dressing in April or early May to timothy and other grassland meadows at rates of 150 to 200 lb. per acre, will produce from ¾ to 1½ tons more hay per acre. The protein content and feeding value of the fertilized hay is likewise improved. He also recommends ammonium nitrate as an excellent fertilizer for grassland pastures as it will usually double milk production and provide a week's earlier grazing.

Mr. Chapman points out, however, that the continuous use, year after year, of this or any other straight nitrogen fertilizer will eventually result in the depletion of the available reserves of lime, phosphate and potash in the soil. It is therefore recommended that the mineral reserves of the soil be maintained through the application of lime, phosphate and potash fertilizers, together with the systematic use of stable manure. Larger increases from the use of ammonium nitrate can be expected on land that has been so treated.

Lime, phosphate-potash fertilizers and manure are best applied at the time of fitting the land for seedlings of winter wheat or rye or for spring grain. Increases in the yield of the grain crop will usually more than pay the cost of the fertilizer. The residual effect of the fertilizer will result in substantial increases in the yields of clover and timothy the year following. However, lime and fertilizers can be applied as top dressings on hay or pasture land.

In two other demonstrations with dairy herds which were fed half of the season on fertilized pasture and half on unfertilized pasture, it was found that even with milk at the low price of $1.00 per cwt. there was a return of $4.00 for every dollar expended on cyanamid top dressing applied at the rate of 300 lb. per acre and the same return on sulphate of ammonia at 200 lb. per acre.

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	Spurway soil-test readings
Nitrate	25 to 60 ppm
Phosphorus	5 to 10 ppm
Potassium	20 to 30 ppm

Test the soil before planting the crop. Add 5 lbs. of superphosphate per 100 square feet of bench area if the test is below 5 ppm. phosphorus. Add 1 lb. of muriate of potash if the potassium test is below 20 ppm. Repeat the potash fertilization any time the test is below 20 ppm. After the crop is established, add 1 lb. of 16–20 per cent nitrogen carrier per 100 square feet whenever the soil test indicates less than 25 ppm. nitrate.

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Fall Fertilization Practices in Delaware

Professor C. E. Phillips says, "Proper use of fertilizers during the fall should increase considerably the yield of crops for feed supplies as well as grain crops for human and industrial consumption. At Newark the wheat yields have been increased as much as 13 bushels per acre by an application of 300 lbs. of an 0–12–12 fertilizer. At Seaford yields have been increased from 11 to 21 bushels from an application of 300 lbs. of a 3–12–6 in the fall, and a spring nitrogen topdressing. The recommendations for fall fertilization of small grains are 300 to 400 lbs. per acre of 2–12–12 or 3–12–6 fertilizer on sandy soils or heavy soils low in fertility. On heavier soils usually higher in fertility, the same amount of an 0–14–7 is recommended. However, if clover is to be seeded in the grain, it would pay to use an 0–12–12."

POTASH IN 1944

(Continued from page 12)

the refining process. Descriptions of the operations have appeared in two articles (*6*) and in a large, illustrated booklet issued by the company. The stock of the company remained vested in the hands of the Alien Property Custodian, although rumors of a proposed offering of the stock for sale appeared in financial journals about midyear.

Since January 1944 the Western Electrochemical Company has been producing potassium perchlorate in Los Angeles. Descriptionsof the plant appeared late in the year (*7*).

Maryland.—Only one company in Maryland produced byproduct potash for agricultural use in 1944. This was the North American Cement Corp. (41 East Forty-second Street, New York City) which at its plant at Security, Washington County, a short

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Pyrethrum products will be available only when military demands permit manufacture. DDT products are now available in small quantities, for experimental use on agricultural crops.

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distance east of Hagerstown, recovered impure sulphate of potash from cement-kiln flue dust.

New Mexico.—Mine production of potash salts in the Carlsbad region of New Mexico continued to increase in 1944, and another record was made. The three companies operating in this area mined 3,749,250 tons of sylvinite and crude langbeinite combined—316,007 tons more than in 1943. The average equivalent K_2O content of the mined salts increased from 21.19 per cent in 1943 to 21.33 per cent in 1944. The average equivalent K_2O content of the sylvinite mined was 22.9 per cent in 1941, 22.7 per cent in 1942, 22.6 per cent in 1943, and 22.7 per cent in 1944.

All three companies mined sylvite (potassium chloride) and one—the International Minerals & Chemical Corp.—mined also langbeinite (a potassium-magnesium sulphate). The greater part of the mined production was sylvite, most of which was processed to yield 60-per cent or higher-grade K_2O muriate. The production of mechantable potash salts in New Mexico in 1944 was 1,337,459 tons (85 per cent of the total domestic production), with an equivalent K_2O content of 694,872 tons (83 per cent of the total production). Sales were 1,304,497 tons (85 per cent of the United States total), with an equivalent K_2O content of 679,721 tons (83 per cent of the domestic total) and valued at $24,739,507. Muriate of potash was produced by all three companies. Potassium sulphate and potassium-magnesium sulphate (sulphate of potash-magnesia) were produced from crude langbeinite by the International Minerals & Chemical Corp. in the refinery at its mine near Carlsbad. Potassium sulphate was produced also by the Potash Company of America.

The abundance of magnesium in 1944 brought about the closing of the magnesium-metal plant at Austin, Tex., in that year: as a result, the Defense Plant Corporation found it unnecessary to continue its production of magnesium-chloride cell feed for the Austin plant from potash salts at its Carlsbad (N. Mex.) plant, adjacent to the refinery of the International Minerals & Chemical Corp., and operations there were stopped in May 1944, after that plant had been in operation about 11 months. Detailed descriptions of this magnesium chloride plant have been published (*8*).

In February 1944 the United States Department of the Interior obtained bids for drilling on, and in the vicinity of, the Potash Reserve established in the Carlsbad region by Executive order in 1931. To determine the extent and richness of this particular deposit, 16 core holes were drilled by the Bureau of Mines in cooperation with the Geological Survey. Drilling was begun about March 1, 1944, and work on the project was completed in October 1944. A few million tons of possible profitably minable potash salts, containing over 20 per cent K_2O, were disclosed by the drilling operations.

Following the suggestion of A. D. Mackay of New York that cesium of rubidium might be found associated with the langbeinite of the Carlsbad area, spectrographic analyses for these elements were made by the Eastern Experiment Station of the Bureau of Mines on specimens of carnallite, langbeinite, and sylvite from that area. Rubidium was found in all three minerals. The largest quantity, around 0.5 per cent of rubidium oxide, appeared in the carnallite. Cesium was found in the sylvite alone and only in traces. Further studies of the occurrence of these two elements in this field are needed to determine whether, in the processes now in use or in future technology, they could be recovered profitably. In the Stassfurt region, Germany, the carnallites contain only small percentages of cesium and rubidium, but these deposits

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are important sources of the metals because their salts become concentrated in the large-scale extraction of potassium chloride.

The geology of the potash-bearing area was discussed by Adams (*9*) in an article published late in 1944. The use of shuttle cars in the mine of the International Minerals & Chemical Corp. was described by Harley(*10*) and in that of the Potash Company of America by Haworth (*11*).

The commercial possibilities and technology of the Texas-New Mexico polyhalite deposits are discussed by Conley and Partridge in a Bureau of Mines bulletin issued in 1944 (*12*)

Utah.—Of the several types of potash occurrences in Utah, only the potassium-bearing brines were in commercial production in 1944. Bonneville, Ltd. (Salt Lake City) continued to produce potassium chloride from Salduro Marsh brines at its plant near Wendover, Tooele County, in northwestern Utah. Production was much above that in 1943 and even exceeded the previous peak of 1942. A detailed description of the operations was published near the end of the year (*13*).

Some development work was carried on in 1944 on the alunite deposits of the Marysville district, Piute County. The Bureau of Mines began operations in May and completed its exploratory work late in October. The earlier work, consisting of surface trenching, diamond drilling, and sampling, was on the White Hills claims. Later, trenching and sampling were done on some of the other claims. Kalunite, Inc. (Box 238, Salt Lake City), did no mining at its Empico (White Horse) mine at Marysville but shipped crude alunite from stock at the mine to its Salt Lake City alumina plant, where it was milled. The Salt Lake City plant was operated only on an experimental basis, production being used in building up the circuit. There were no sales of the products. A description of the plant by the technical director, Arthur Fleischer, was published during the year (*14*).

No development work is known to have taken place in 1944 in the Grand County potash field in eastern Utah. In February 1944 B. W. Dyer (*15*) presented a paper before the New York meeting of the American Institute of Mining and Metallurgical Engineers describing the results of drilling operations in the Crescent Eagle, Salt Valley, Seven Mile, Cane Creek, and Salt Wash areas in eastern Utah.

Public Land Order 130, issued May 26, 1943, which temporarily, withdrew and reserved certain public lands in Utah, therein described, for classification and for prospecting and development under the mineral leasing laws, was revoked by Secretary of the Interior Harold L. Ickes on January 4, 1945, in Public Land Order 256. Subject to valid existing rights, the public lands contained in certain specified areas totaling approximately 210,650 acres, were withdrawn from all forms of appropriation under the public lands laws, including the mining and mineral-leasing laws, and reserved for classification under the jurisdiction of the Secretary of the Interior.

Foreign Trade (*16*)

Imports.—With the continuance of World War activities, imports of potash salts in 1944 remained at the recent low levels, a total of only 19,141 short tons (4,868 tons K_2O) being imported. The total value of imports, however, jumped to $2,048,351 because of the importation of considerable quantities of high-valued argols and cream of tartar. Chile, U. S. S. R., Algeria, and Argentina were the principal sources of imports.

Potash (K_2O) for fertilizer use constituted only 77.2 per cent of the total imports in 1944, whereas in 1943, with the decline in bitartrate imports, fertilizers had formed 99.4 per cent of the total. Imports for chemical use rose in 1944 to 22.8 per cent of the total, largely because of the increased argols imports.

Potassium-sodium nitrate (Chile) was the principal potash salt imported in 1944 for fertilizer use—9,407 tons (1,317 tons K_2O) out of the total of 13,739 tons of fertilizer salts (3,760 tons K_2O) imported. Imports of potassium chloride (muriate) in 1944 were almost entirely from the U. S. S. R. Imports of potassium-bearing materials for consumption in the chemical industries consisted largely of potassium bitartrate as argols and cream of tartar from numerous countries but principally Algeria, Argentina, and Portugal.

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Exports.—The total value of the domestic export trade in potash materials fell from over 7 million dollars in 1943 to $6,238,426 in 1944, declines being registered in the values of both fertilizer and chemical exports; the decrease, however, was mostly in the value of the chemical materials. The total quantity of fertilizer potash materials exported in 1944 —110,057 short tons—was only slightly less than in 1943; the total value still exceeded 3 million dollars. The fertilizer exports went largely to Canada (85,215 tons), with smaller amounts to other countries. Exports of chemical potash materials totaled only 15,419 tons, with a value just over 3 million dollars. The principal potash materials exported were the hydroxide (caustic potash), nitrate and mixtures, chlorate and mixtures, and the carbonate and mixtures. The United Kingdom, Canada, Brazil, and U. S. S. R., in the order named, were the leading recipients of the potash chemicals exported in 1944.

POTASH MATERIALS EXPORTED FROM THE UNITED STATES, 1940–44

Year	Fertilizer		Chemical	
	Short tons	Value	Short tons	Value
1940....	93,060	$3,141,170	14,180	$3,096,909
1941....	91,950	2,592,697	12,883	2,972,137
1942....	84,402	2,184,044	13,307	3,611,656
1943....	111,541	3,168,446	20,133	3,950,542
1944....	110,057	3,139,851	15,419	3,098,565

POTASH MATERIALS IMPORTED FOR CONSUMPTION IN THE UNITED STATES, 1943–44

Material	Approximate equivalent as potash (K_2O) (per cent)	1943 Short tons	1943 Approximate equivalent as potash (K_2O) Short tons	1943 Approximate equivalent as potash (K_2O) Per cent of total	1943 Value	1944 Short tons	1944 Approximate equivalent as potash (K_2O) Short tons	1944 Approximate equivalent as potash (K_2O) Per cent of total	1944 Value
Used chiefly in fertilizers:									
Muriate (chloride).....	56.4	25,212	14,220	83.1	$705,602	4,332	2,443	50.2	$119,041
Potassium-sodium nitrate mixtures, crude.....	14.0	19,767	2,767	16.2	580,760	9,407	1,317	27.0	278,534
Other potash fertilizer material[1].....	60.0	30	18	.0	660	....	....	....	....
Total fertilizer.....	....	45,009	17,005	99.4	1,287,022	13,739	3,760	77.2	397,575
Used chiefly in chemical industries:									
Bitartrate:									
Argols.....	20.0	319	64		105,505	5,061	1,012		1,417,464
Cream of tartar.....	25.0	4	1		3,647	261	65		199,455
Chlorate and perchlorate...	36.0	66	24	.6	25,226	61	22	22.8	17,332
Ferricyanide (red prussiate).....	42.0	....	....		....	1	[2]		1,433
All other.....	50.0	30	15		21,719	18	9		15,092
Total chemical.....	....	419	104	.6	$156,097	5,402	1,108	22.8	$1,650,776
Grand total.....	....	45,428	17,109	100.0	$1,443,119	19,141	4,868	100.0	$2,048,351

[1]Chiefly wood ashes from Canada. [2]Less than 1 ton.

(Continued on page 28)

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See Page 4

World Production

Production returns are available for but few foreign countries in recent years. Operations have been in progress, however, in several countries. Soviet Russia, with its large reserves in the Solikamsk region, controls the potash industry of eastern Europe, and in 1944 the capture of the Polish potash fields added to its reserve. Fersman (*17*) in a recent article refers to the discovery of the Solikamsk deposits as giving rise to the establishment of the world's largest potassium industry and describes the Soviet deposits of potassium salts as the most extensive known in the world, 35 times as great as all other known reserves. He considers the Solikamsk deposits able to supply the entire world demand for potassium fertilizers for many thousands of years.

In Western Australia the output of potash from the Lake Campion alunite deposits late in 1944 is reported as about 5 tons daily, with modifications of the plant in process to raise the daily output to 13 tons.

Potash deposits were discovered in exploratory work at the Malagash salt mine in Nova Scotia in 1944. Reserves are estimated as several hundred thousand tons containing an average of 8 per cent KCl.

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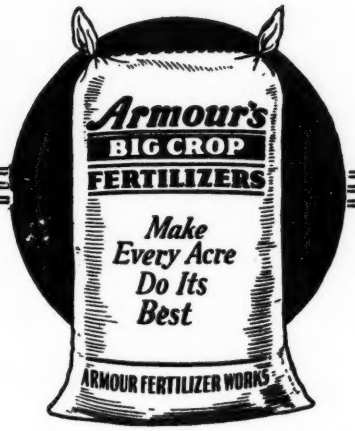

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For Alphabetical List of Advertisers, see page 33.

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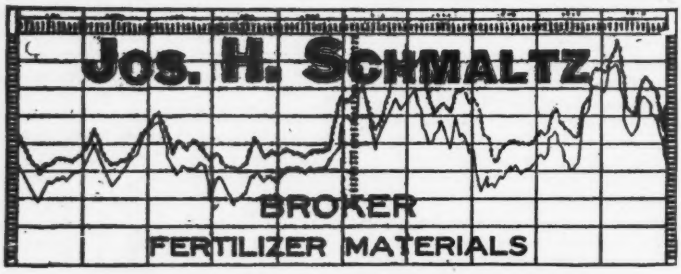

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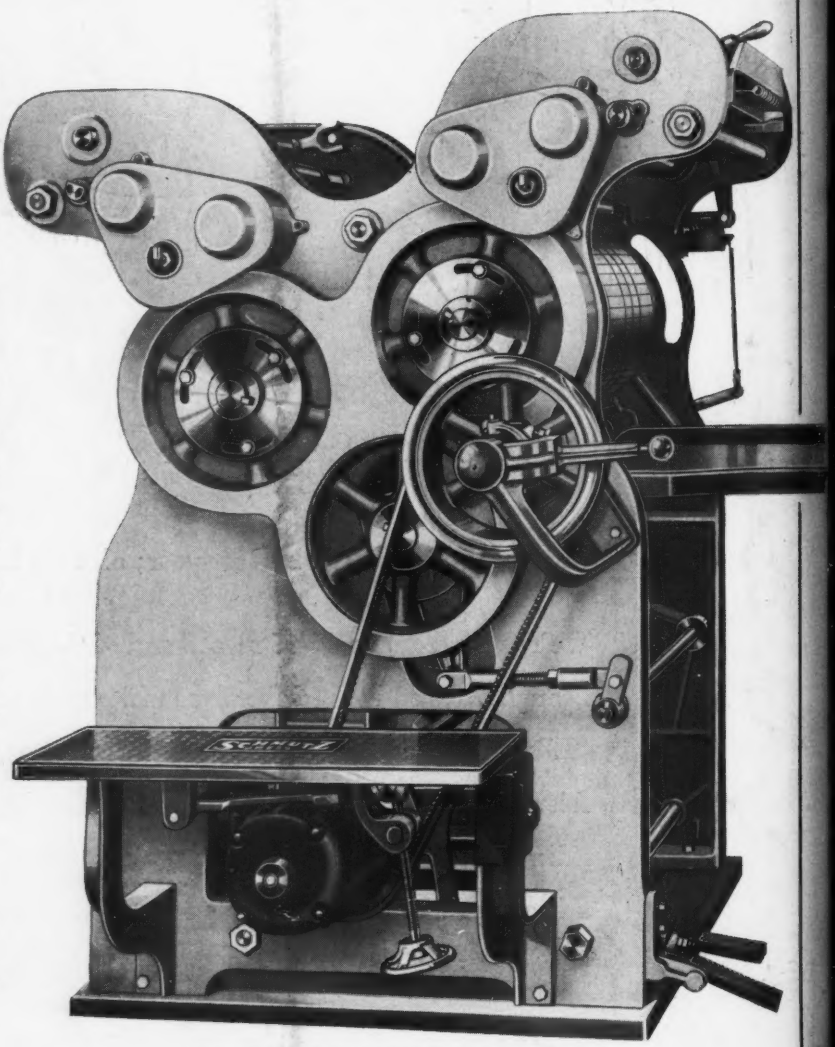

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